

SECTION 2

Coastal Monitoring Coordinator Regional Summaries

The California coast was broken into the eight areas (illustrated in Figures 1 & 2) for ease in coordination of volunteers for this event along the 1900 miles of the state's coast. This also facilitated a network of coordinators and the encouragement of citizen watershed groups to become involved in water quality monitoring in their communities by developing "local" expertise—a fundamental goal of the project.

CMCs were chosen based on their experience conducting citizen based monitoring, their experience in volunteer recruitment, their relationships with other organizations in their region, and their interest in participating.

The following are excerpts from the eight Coastal Monitoring Coordinator's regional reports:

Oregon to Navarro River Executive Summary-RCAA

The North Coast Snapshot Day event was successful at meeting all of the Coast Wide Snapshot Day (CWSD) objectives. In addition to monitoring 54 stations on 41 unique waterbodies and involving 54 participants, the core components of this Snapshot Day -- coordination and collaboration (locally and statewide) -- were among the most beneficial of the objectives met. The Natural Resources Services Division (NRS) of Redwood Community Action Agency developed relationships with agencies and organizations coast wide through this event, and worked closely with laboratories, schools, citizens and watershed groups in our community. The map in Figure 5 (on the following page) shows the monitoring stations for the Oregon to Navarro River coastal area.

Waterbodies as diverse as urban drainages, brackish sloughs, and major river systems were monitored on Snapshot Day. Thirty-five percent of those sites were established monitoring sites while the remaining sixty-five percent are newly established sites. Thirty percent of the sites are on the list of impaired water bodies under provisions of section 303 of the Clean Water Act (most are sediment and temperature impaired).



A scenic view, slightly north of Trinidad Head close to where three Snapshot Day locations drain into the Pacific Ocean.

California Coast Wide Snapshot Day 2003



Figure 5. Snapshot Day monitoring stations between the Oregon Border and the Navarro River.

California Coast Wide Snapshot Day 2003

Teams measured dissolved oxygen, pH, conductivity, temperature, and transparency or turbidity -- all parameters that measure the health of a water body and its ability to support fish and other aquatic organisms. Some teams took samples of nutrients and bacteria that were later tested in the laboratory. Table 5 provides a summary of the result statistics for this area.

Table 5. RCAA Result Statistics and exceedence table

| RCAA Oregon Border to Navarro River | | | | | | | |
|-------------------------------------|----------------------|------------------|-----------------------|--------------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Stations with Exceedences | Minimum Result | Maximum Result | Average Result |
| AirTemp (Deg C) | none | 49 | | | 9.00 | 20.00 | 13.79 |
| Conductivity (uS) | none | 52 | | | 52.00 | 350.00 | |
| Dissolved Oxygen (ppm) | ≥ 7 | 54 | 7 | 13% | 5.00 | 12.00 | 8.94 |
| pH | $\geq 6.5, \leq 8.5$ | 54 | 1 | 2% | 6.00 | 8.20 | 7.20 |
| Transparency (cm) | ≥ 25 | 35 | 2 | 6% | 2.00 | 122.00 | 93.57 |
| Turbidity (JTU) | ≤ 20 | 20 | 4 | 20% | 0.00 | 62.50 | 15.13 |
| WaterTemp (Deg C) | ≤ 22 | 54 | 0 | 0% | 9.00 | 18.00 | 11.67 |
| Fecal coliform (CFU/100 ml) | ≤ 400 | 13 | 0 | 0% | 0.00 | 334.00 | |
| Total coliform (MPN/100ml) | ≤ 10000 | 13 | 0 | 0% | 0.00 | 1600.00 | |
| Nitrate N (mg/L) | ≤ 2.25 | 4 | 0 | 0% | 0.00 | 1.80 | 0.53 |
| Ortho-phosphate P (mg/L) | ≤ 0.10 | 4 | 0 | 0% | 0.00 | 0.03 | 0.02 |

Most of the sites monitored on Snapshot Day fell in the “healthy” range. Dissolved oxygen deficiencies in seven streams raised the most concern of all north coast data collected. The number of exceedences for each parameter is listed in the Table 5. Turbidity and transparency were the two other parameters with exceedences, both are indicators of the amount of suspended solids in the water.

The map in Figure 6 shows stations with results for both field and laboratory parameters found to be in unacceptable ranges. There were no Areas of Concern identified for this coastal region.

Rocky terrain, heavy spring rains, landslides, and remote communities made coordinated citizen monitoring in northern California a challenging endeavor! NRS could not have succeeded had it not been for the faithful, energetic, and adventurous volunteers, many of whom were already experienced in water quality testing, while others were “getting their feet wet” for the first time.

California Coast Wide Snapshot Day 2003



Figure 6. Monitoring stations between the Oregon Border and the Navarro River with field result values in unacceptable ranges. No lab result fell outside of acceptable ranges for this area.

Navarro River to Marin Headlands Executive Summary-SRCD

Snapshot Day activities for the Navarro to Marin Headland region were coordinated by the Sotoyome Resource Conservation District. This region covered stretched from the Navarro River watershed in the north to Stinson Beach in the south, covering over 170 miles of California coastline and several major coastal drainages, including Bolinas Lagoon, Tomales Bay, the Russian, Gualala, Garcia and Navarro Rivers. The map in Figure 7 shows the monitoring stations for the Navarro River to Marin coastal area. The regional effort brought together a coalition of agency personnel, local organizations, and community volunteers interested in the health of their waterways. This was the first coordinated synoptic monitoring effort for this region, as well as for the California coast, and was made possible thanks to funding from the US Environmental Protection Agency and the California State Water Resources Control Board.

This year, within the Navarro-Marín Headland region, 71 sites were monitored by 46 people. Water bodies as diverse as urban drainages, bays and lagoons, and major river systems were monitored. Teams measured dissolved oxygen, pH, conductivity, temperature, and transparency/turbidity. These are all parameters that measure the health of a water body and its ability to support fish and other aquatic organisms. Most of the sites monitored on Snapshot Day appear to fall in the “healthy” range. Table 6 summarizes the results from this region.



Volunteers monitoring on 3rd Valley Creek, a tributary to Tomales Bay

Table 6. SRCD Result Statistics and exceedence table

| SRCD Navarro River to Marin Headlands | | | | | | | |
|---------------------------------------|----------------------|------------------|-----------------------|--------------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Stations with Exceedences | Minimum Result | Maximum Result | Average Result |
| AirTemp (Deg C) | none | 71 | | | 9.00 | 31.00 | 17.40 |
| Conductivity (uS) | none | 66 | | | 2.00 | 51600.00 | |
| Dissolved Oxygen (ppm) | ≥ 7 | 71 | 4 | 6% | 5.00 | 11.80 | 8.78 |
| pH | $\geq 6.5, \leq 8.5$ | 71 | 0 | 0% | 6.50 | 8.30 | 7.54 |
| Transparency (cm) | ≥ 25 | 45 | 1 | 2% | 12.10 | 122.00 | 108.14 |
| Turbidity (JTU) | ≤ 20 | 20 | 1 | 5% | 0.60 | 20.70 | |
| Water Temp (Deg C) | ≤ 22 | 71 | 0 | 0% | 10.00 | 19.00 | 13.45 |
| E. Coli (MPN/100 ml) | ≤ 235 | 10 | 5 | 50% | 1.00 | 2419.20 | |
| Fecal coliform (MPN/100 ml) | ≤ 235 | 17 | 3 | 18% | 11.00 | 500.00 | |
| Total coliform (MPN/100ml) | $\leq 10,000$ | 27 | 0 | 0% | 1.00 | 2419.20 | |
| Nitrate-N (mg/L) | ≤ 2.25 | 27 | 0 | 0% | 0.10 | 0.70 | 0.33 |
| Ortho-phosphate-P (mg/L) | ≤ 0.10 | 27 | 4 | 15% | 0.10 | 0.44 | 0.12 |

California Coast Wide Snapshot Day 2003



Figure 7. Snapshot Day monitoring stations between the Navarro River and the Marin Headlands

California Coast Wide Snapshot Day 2003

Due to the generous donation of laboratory services in both Marin and Sonoma Counties, 27 water samples were also collected for laboratory analysis of nitrate, orthophosphate and bacteria at sites in the Russian River, Bolinas Lagoon, and Tomales Bay watersheds. While these constituents naturally occur, excessive concentrations, usually introduced by humans, can be harmful to both human health and aquatic organisms. High levels of bacteria can cause illness in humans and usually are the result of failing septic systems or illicit connections to the storm drain system.

High nutrient levels can cause algal blooms, which can in turn cause vegetation to choke a stream with too much plant growth and can deplete the amount of oxygen in the water that organisms require to breathe.

The average dissolved oxygen level for lower north coast sites was 12.5 mg/l. Four of the sites reported dissolved oxygen levels below the COLD water quality objective. These four sites had DO results of 5 mg/l. Water bodies with low oxygen concentration included sites in the lower Russian River watershed including two lower main stem sites, Willow and Dutch Bill Creeks. *E. coli* and fecal coliform concentrations exceeded the water quality objective in approximately 29% of the sites monitored. The highest concentration was found in Haggerty Gulch, a tributary to Tomales Bay, reporting 2419 MPN/100 ml. Three other sites in the Tomales Bay watershed exceeded the objective. These sites included the lower Lagunitas Creek 261.3 MPN/100 ml, Olema Creek 387.3 MPN/100 ml and Tomasini Creek with a result of 517.2 MPN/100 ml. A sample taken at Alder Creek, tributary to Duxbury Reef, also exceeded the objective with a result of 517.2 MPN/100 ml. Four sites had results above the General Basin Plan Objective for orthophosphate (as P) set at 0.10 mg/l. Orthophosphate results ranged from non-detect at many sites to 0.44 mg/l in the Laguna de Santa Rosa. Other orthophosphate exceedences were measured on Matanzas Creek at 0.11 mg/l, Olema Creek at 0.11 mg/l, and Walker Creek at 0.14 mg/l.

The map in Figure 8 shows stations results for field parameters, and Figure 9 shows station results for lab parameters, which were found to be in unacceptable ranges. Areas of Concern are defined as sites that exceeded three or more parameters. There were no Areas of Concern identified for this region.

This event was a regional success due to the coordination and efforts of an array of local watershed groups and community volunteers. Six of these organizations were given monitoring equipment and training that will allow them to continue monitoring their watersheds to augment the sampling results highlighted during the Snapshot Day and the priorities of their local community.



Figure 8. Monitoring stations between the Navarro River and the Marin Headlands with field results in unacceptable ranges.



Figure 9. Monitoring stations between the Navarro River and the Marin Headlands with laboratory results in unacceptable ranges.

San Francisco Bay Area Executive Summary-FOE

Friends of the Estuary (FOE), an Oakland-based non-profit environmental education organization, was the coordinating agency for San Francisco Bay Area watershed groups participating in the May 17, 2003 California statewide Snapshot Day event. Sixty monitoring sites were surveyed on 28 waterways (including a sample of creeks, estuarine inlets, a lake and a river) in Santa Clara, Alameda, Contra Costa, Marin, and Napa Counties. The map in Figure 10 shows the monitoring stations for the San Francisco Bay area.

Ninety-five volunteers participated, representing 25 Bay Area creek groups. Several creek groups that wanted to participate were unable to provide volunteers on Snapshot Day. In such cases, FOE conducted the monitoring for them at waterway monitoring sites designated by these creek groups.

Data Collection

Monitoring volunteers recorded observations on the physical conditions of their water-body, and fish and wildlife they observed. They collected water quality data on temperature (water and air), pH levels, dissolved oxygen content, conductivity transparency and turbidity. In addition, 8 samples were collected for nitrate and orthophosphate lab analysis; and 4 water samples were collected for bacteria analysis.

Many groups were not able to collect data for all of the parameters, primarily because of lack of equipment, or because they do not normally collect data for certain parameters. Notably we had a low representation of data for conductivity, Nitrate-N, Orthophosphate-P, and transparency.

Nonetheless parameters reported in the cumulative data set are generally well represented. For each parameter, the percentage of sites that collected data breaks down as follows: air temperature 88%; water temperature 95%; conductivity 23%; dissolved oxygen 73%; nitrate 7%; pH 92%; Orthophosphate-P 5%; Transparency 10%; and Turbidity 62%. Table 7 provides a summary of the result statistics for this area.

Table 7. FOE Result Statistics and exceedence table.

| FOE San Francisco Bay and Surrounding Areas | | | | | | | | |
|---|----------------------|------------------|-----------------------|-----------------------------------|----------------|----------------|----------------|--------------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Sites with Exceedences | Minimum Result | Maximum Result | Average Result | Standard Deviation |
| AirTemp (Deg C) | none | 48 | | | 10.50 | 34.00 | 19.85 | 4.27 |
| Conductivity (uS) | none | 15 | | | 9.20 | 1620.00 | 897.95 | |
| Dissolved Oxygen (ppm) | ≥ 7 | 39 | 12 | 31% | 3.86 | 15.00 | 8.70 | 2.37 |
| pH | $\geq 6.5, \leq 8.5$ | 49 | 1 | 2% | 7.00 | 8.60 | 7.81 | 0.47 |
| Turbidity (JTU) | ≤ 20 | 34 | 3 | 9% | 0.00 | 90.00 | 8.44 | |
| WaterTemp (Deg C) | ≤ 22 | 51 | 2 | 4% | 11.10 | 25.80 | 16.23 | 3.09 |
| E. Coli (MPN/100 ml) | ≤ 235 | 4 | 2 | 50% | 30.00 | 663.00 | 267.25 | |
| Total coliform (MPN/100ml) | ≤ 10000 | 4 | 1 | 25% | 2143.00 | 24192.00 | 8321.00 | |
| Nitrate-N (mg/L) | ≤ 2.25 | 8 | 0 | 0% | 0.10 | 0.80 | 0.33 | 0.32 |
| Ortho-phosphate-P (mg/L) | ≤ 0.10 | 8 | 4 | 50% | 0.10 | 1.00 | 0.28 | 0.39 |

California Coast Wide Snapshot Day 2003



Figure 10. Snapshot Day monitoring stations in the San Francisco Bay area.

Setting, Physical Quality, and Usage

There is great variety in the settings, physical quality and recreational usage of the surveyed water-bodies. Lake Merritt is a popular recreational site in Oakland that outlets into the San Francisco Estuary. Some survey sites such as Alameda Creek in the City of Fremont, Sausal Creek, Arroyo Viejo Creek and Peralta Creek in Oakland, Wildcat Creek in San Pablo, San Francisquito Creek in the City of Palo Alto, and the Guadalupe River site are also popular recreational sites for activities such as walking, jogging, and bird watching. The Guadalupe River, San Pablo Creek and Walnut Creek, flow through downtown areas.



Steve Cochran, CMC for the Bay area, titrates the dissolved oxygen test in the field on Snapshot Day 2003 .

Water Quality Exceedences

In terms of water chemistry assessments, none of the reported data indicates that the monitored water bodies are in peril. However, several water bodies, including portions of Wildcat Creek in San Pablo have obvious signs of pollution. Physical observations of several water bodies indicate obvious signs of pollution such as trash, alga overgrowth, and human disturbance at many of the monitored locations. Thirty-one percent of the monitored sites reported low dissolved oxygen levels. Two of the four sites, Stevens Creek and Guadalupe River exceeded the E. coli water quality objective. Three of the four sites monitored exceeded the orthophosphate water quality objective. The number of exceedences for each parameter is listed in the table below.

The map in Figure 11 shows stations with results for field parameters found to be in unacceptable ranges, and Figure 12 shows stations with results for lab parameters in unacceptable ranges. There was one Area of Concern identified for this region (Matadero Creek), which is shown in the insert box on Figure 12.

California Coast Wide Snapshot Day 2003

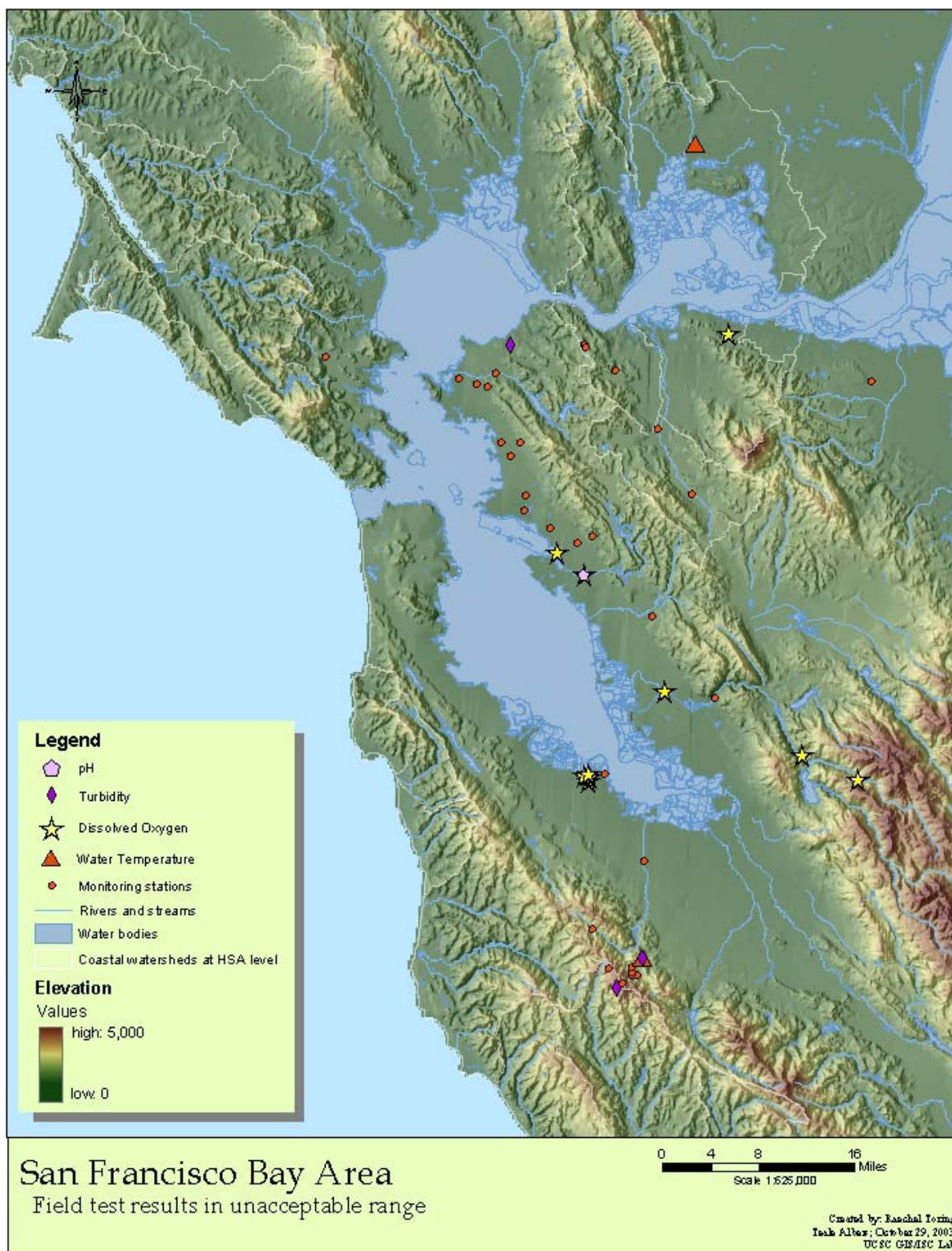


Figure 11. Snapshot Day monitoring stations in the San Francisco Bay area with field results in unacceptable ranges.

California Coast Wide Snapshot Day 2003

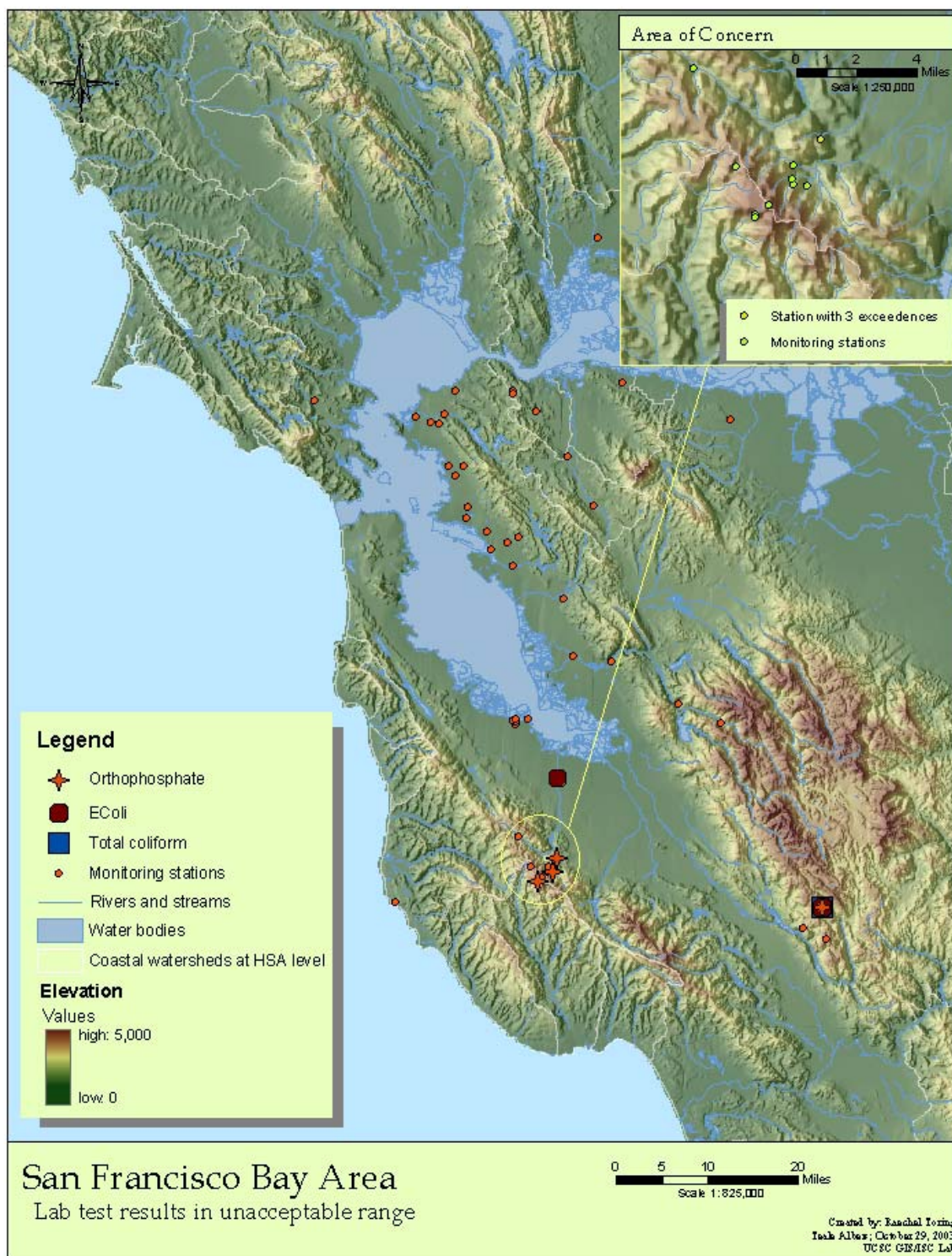


Figure 12. Snapshot Day monitoring stations in the San Francisco Bay area with laboratory results in unacceptable ranges. The insert box shows the location of the single station designated an Area of Concern for this region.

Pacifica to Morro Bay Executive Summary-MBNMS

Snapshot Day began on the Central Coast four years ago on Earth Day 2000. Volunteers collected water quality data in watersheds from Pacifica south to Morro Bay. Original partners were the Monterey Bay National Marine Sanctuary, the Coastal Watershed Council, the California Coastal Commission, and The Ocean Conservancy.

This year, within the Monterey Bay National Marine Sanctuary, 155 people monitored 155 sites. Teams measured dissolved oxygen, pH, conductivity, temperature, and transparency/turbidity. Water samples were also collected for laboratory analysis of nitrate, orthophosphate and bacteria at the majority of sites. The map in Figure 13 shows the monitoring stations for the Central Coast region.

This was a special year for Snapshot Day because the successful Central Coast event spread to the entire coast of California. At two of the hubs, we were honored with the company of several local and state elected officials. In Santa Cruz, Assemblyman John Laird, County Supervisor Ellen Pirie, and Mayor Emily Reilly spoke out in support of the Coast Wide event, encouraged volunteers to continue to be involved in their watersheds and declared May 17th, 2003 “Snapshot Day” 2003 in the City of Santa Cruz. In Monterey, Senator Bruce MacPherson, Assemblyman Laird’s Aid Gary Shalcross, and Sanctuary Superintendent Bill Douros were present to inspire and thank all of the volunteers for their commitment to this event. They were grateful to the Coordinators for taking the lead on this project and making it happen.



Volunteers use a CHEMets DO kit to monitor the San Lorenzo River in Santa Cruz.

Dissolved oxygen (DO) was the most common field measurement that did not meet the water quality objective at 10% of the sites. Most of these sites were located in the Watsonville sloughs as well as Santa Cruz, Monterey and San Luis Obispo streams. The lowest DO value was found in Watsonville Slough. As for the laboratory analysis, *E. coli* water quality objectives were exceeded at 27% of the sites and orthophosphate at 23% of the sites. The *E. coli* exceedences were pretty evenly distributed through all four counties while the orthophosphate exceedences were found primarily in the Watsonville sloughs, Elkhorn Sloughs and lower Salinas Valley. Elkhorn Slough in Monterey County had the highest concentration, reporting 1.72 ppm orthophosphate (as P). Table 8 provides a summary of the result statistics for this area.

California Coast Wide Snapshot Day 2003



Figure 13. Snapshot Day monitoring stations between Pacifica and the Morro Bay area.

California Coast Wide Snapshot Day 2003

Table 8. MBNMS Result Statistics and exceedence table.

| CENTRAL COAST | | Pacifica to Morro Bay | | | | | |
|------------------------------|----------------------|-----------------------|-----------------------|-----------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Sites with Exceedences | Minimum Result | Maximum Result | Average Result |
| AirTemp (Deg C) | none | 153 | | | 12.00 | 31.00 | 17.91 |
| Conductivity (uS) | none | 138 | | | 30.00 | 7560.00 | |
| Dissolved Oxygen (ppm) | ≥ 7 | 153 | 16 | 10% | 0.32 | 16.40 | 8.94 |
| pH | $\geq 6.5, \leq 8.5$ | 154 | 5 | 3% | 6.25 | 9.50 | 7.58 |
| Salinity (ppt) | none | 4 | N/A | N/A | 0.98 | 31.97 | 24.11 |
| Transparency (cm) | ≥ 25 | 62 | 11 | 18% | 2.00 | 120.00 | 87.50 |
| Turbidity (JTU) | ≤ 20 | 65 | 1 | 2% | 0.00 | 40.00 | |
| WaterTemp (Deg C) | ≤ 22 | 154 | 3 | 2% | 9.50 | 26.00 | 14.86 |
| E. Coli (MPN/100 ml) | ≤ 235 | 153 | 41 | 27% | 0.00 | 24192.00 | |
| Total coliform (MPN/100ml) | ≤ 10000 | 143 | 23 | 16% | 85.00 | 199000.00 | |
| Ammonia-N (ppm) | none | 5 | N/A | N/A | 0.02 | 0.03 | 0.03 |
| Nitrate-N (mg/L) | ≤ 2.25 | 142 | 18 | 13% | 0.00 | 78.30 | 2.47 |
| Ortho-phosphate-P (mg/L) | ≤ 0.10 | 142 | 32 | 23% | 0.00 | 1.72 | 0.12 |
| Total dissolved solids (ppm) | none | 4 | N/A | N/A | 442 | 888 | 659.25 |

The map in Figure 14 shows stations where results for field parameters were found to be in unacceptable ranges, and Figure 15 shows stations where lab results were found to be in unacceptable ranges.

In 2003 there were nineteen Areas of Concern compared to eleven in 2002. These sites are all located between the lower Salinas Valley and Watsonville sloughs, with the exception of Yerba Buena Creek in the Atascadero area. Six of the sites were Areas of Concern in 2002, and three sites, Alisal Slough, Alisal Creek and Natividad Creek have been Areas of Concern for three straight years, primarily because of high sediment, nutrients, and bacteria. Figure 16 shows stations that were identified as Areas of Concern for the region between Pacifica and Morro Bay.



Volunteers at the Monterey County Hub

Overall, the surface waters of the Central Coast monitored on May 17, 2003 appear to be generally healthy. The volunteers collecting the data were well trained, and the rigorous quality assurance that was implemented for this event gives us confidence that the results we are presenting in this report are accurate. This was the fourth annual Snapshot Day on the Central Coast and even with just one data point a year, the information it provides is used to supplement year round monitoring data as well as provide annual trends by comparing the Areas of Concern. In general, these locations are receiving much attention and funding for restoration.

California Coast Wide Snapshot Day 2003



Figure 14. Snapshot Day monitoring between Pacifica and the Morro Bay area with field results in unacceptable ranges

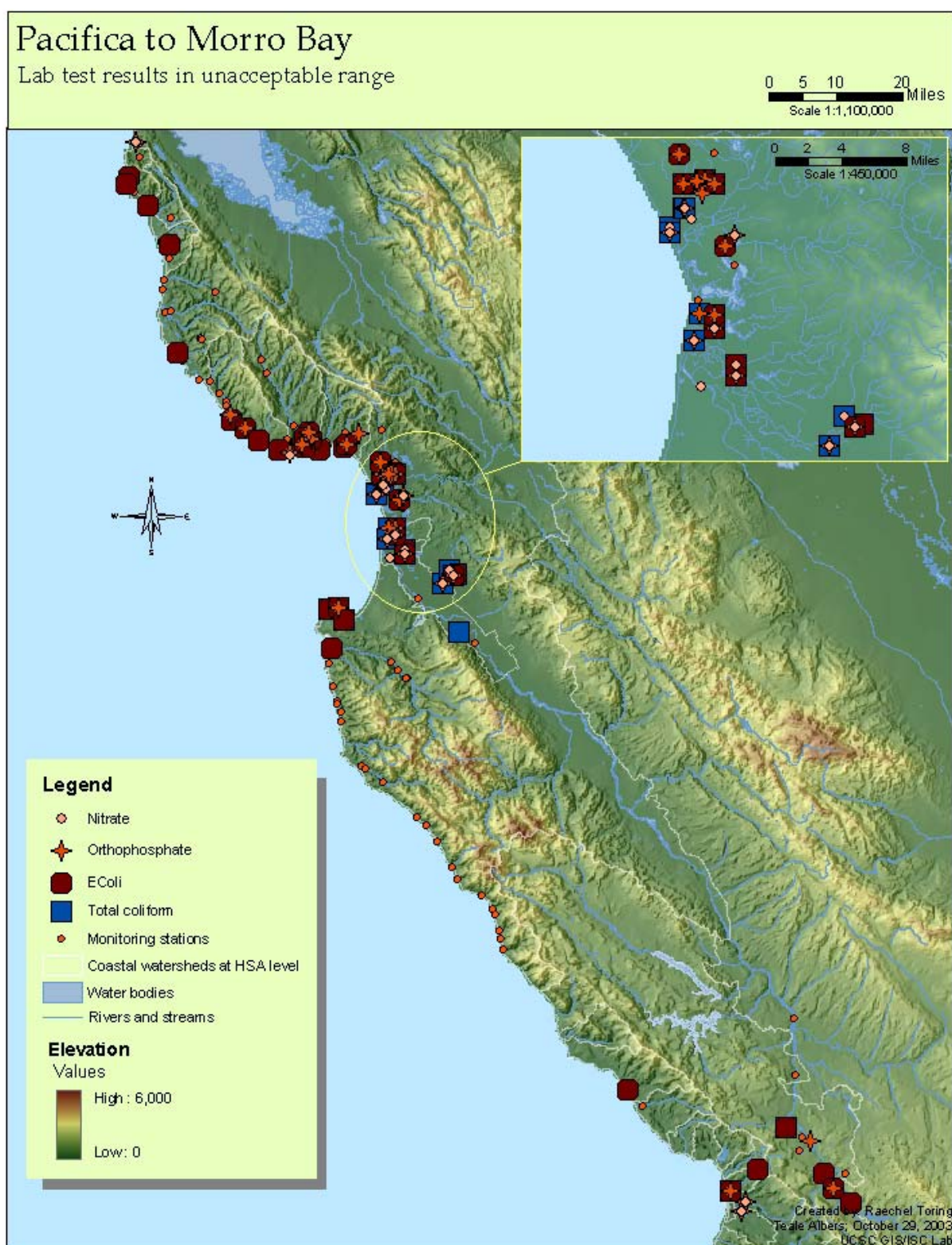


Figure 15. Monitoring stations between Pacifica and the Morro Bay area with laboratory results in unacceptable ranges.

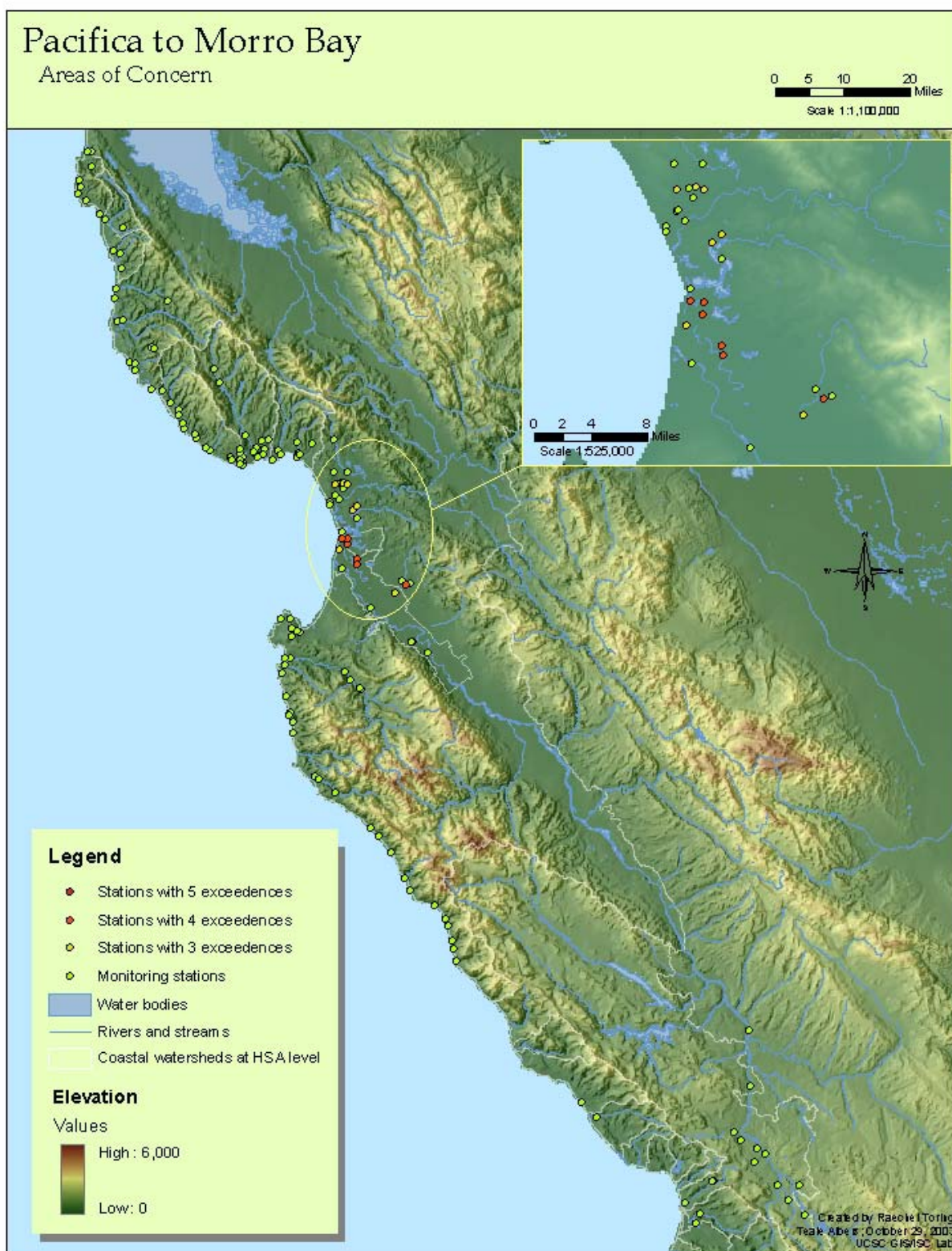


Figure 16. Snapshot Day monitoring stations between Pacifica and the Morro Bay area identified as Areas of Concern in 2003.

Morro Bay to Ventura, Region Executive Summary-SBCK

On May 17th, 2003, volunteers from across the state participated in California's first Coast-Wide Snapshot Day. Santa Barbara Channelkeeper served as the regional coordinator from Morro Bay in San Luis Obispo County, through Santa Barbara County and Ventura County.

In this region, we collected data at 56 sites on rivers, creeks, wetlands, springs, the ocean, as well as artificial drains and channels (See Figure 17). Each water body was tested for dissolved oxygen, temperature, conductivity, pH, and transparency or turbidity. Visual observations were also recorded at each site. In addition, water samples were taken and analyzed at various laboratories for nutrient and bacteria content. Table 9 provides a summary of the result statistics for this area.



Figure 17. Snapshot Day monitoring stations in the Morro Bay to Ventura area.

California Coast Wide Snapshot Day 2003

Table 9. SBCK Result Statistics and exceedence table.

| SBCK Morro Bay to Ventura County | | | | | | | |
|----------------------------------|----------------------|------------------|-----------------------|-----------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Sites with Exceedences | Minimum Result | Maximum Result | Average Result |
| AirTemp (Deg C) | none | 45 | | | 16.28 | 24.56 | 19.34 |
| Conductivity (uS) | none | 47 | | | 0.00 | 49000.00 | |
| Dissolved Oxygen (ppm) | ≥ 7 | 50 | 7 | 14% | 0.59 | 19.40 | 9.86 |
| pH | $\geq 6.5, \leq 8.5$ | 52 | 4 | 8% | 6.94 | 9.40 | 8.06 |
| Transparency (cm) | ≥ 25 | 26 | 1 | 4% | 17.00 | 120.00 | 115.43 |
| Turbidity (NTU) | ≤ 20 | 26 | 0 | 0% | 0.00 | 220.00 | |
| WaterTemp (Deg C) | ≤ 22 | 52 | 5 | 10% | 14.54 | 25.83 | 18.25 |
| E. Coli (MPN/100 ml) | ≤ 235 | 51 | 15 | 29% | 0.00 | 14136.00 | |
| Nitrate-N (mg/L) | ≤ 2.25 | 52 | 18 | 35% | 0.00 | 55.83 | 5.01 |
| Ortho-phosphate-P (mg/L) | ≤ 0.10 | 52 | 3 | 6% | 0.01 | 8.95 | 0.38 |

The map in Figure 18 shows stations with results for field parameters found to be in unacceptable ranges, and Figure 19 shows stations with results for lab parameters found to be in unacceptable ranges.

Results were compared to various water quality objectives put forth by state and federal government agencies. We found that most of our sites were relatively “healthy”, with most measurements falling within safe ranges.

The water quality objectives that were most frequently exceeded were for nutrients (nitrate and orthophosphate) and bacteria (E.coli). While these are naturally occurring in many waterways, many human activities cause levels to rise to abnormal, unsafe levels. For example, nutrient levels are often high in waterways that run through agricultural areas, which can cause vegetation to “choke” a stream by depleting oxygen levels. Bacteria levels are often high in areas with improper sewage and/or septic systems, which is dangerous for human health.

Still, most sites exceeded at least one water quality objective. Seven sites exceeded 3 or more water quality objectives; these sites were classified as “Areas of Concern”. See the Table 9 for the number of exceedences for each parameter. Figure 20 shows where there were Areas of Concern identified for the southern San Luis Obispo, Santa Barbara, and Ventura County areas.



Santa Barbara Channelkeeper volunteer at Faria Creek

California Coast Wide Snapshot Day 2003



Our data collection was made possible by the incredible teamwork of 46 trained volunteers throughout the region. The volunteers' efforts were praised by California Coastal Commissioner Pedro Nava and 2nd District Supervisor Susan Rose at our Santa Barbara hub as they gathered for the event.



Figure 18. Monitoring stations between Morro Bay and Santa Barbara County with field results in unacceptable ranges.

California Coast Wide Snapshot Day 2003

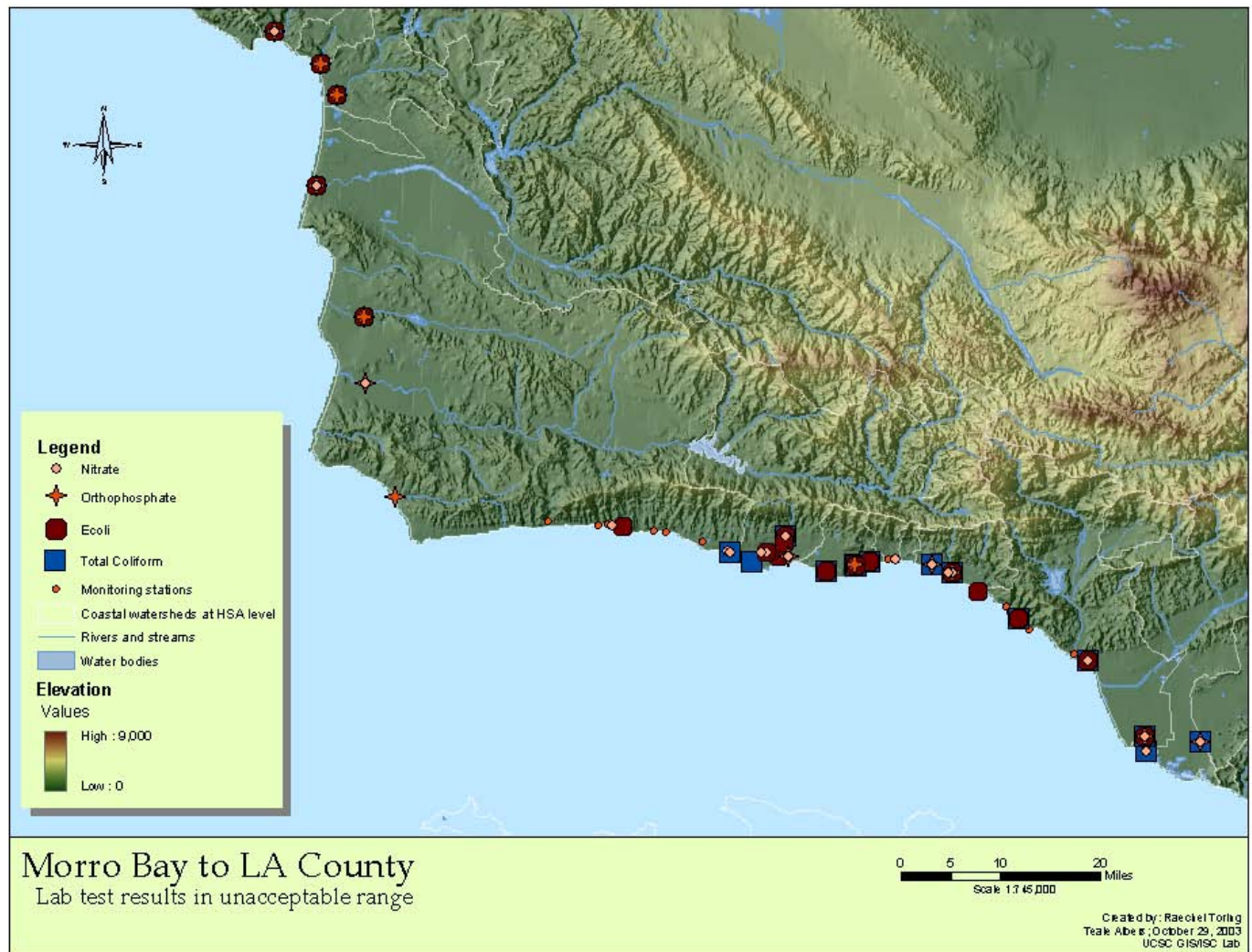


Figure 19. Monitoring stations between Morro Bay and Ventura County with lab results in unacceptable ranges.

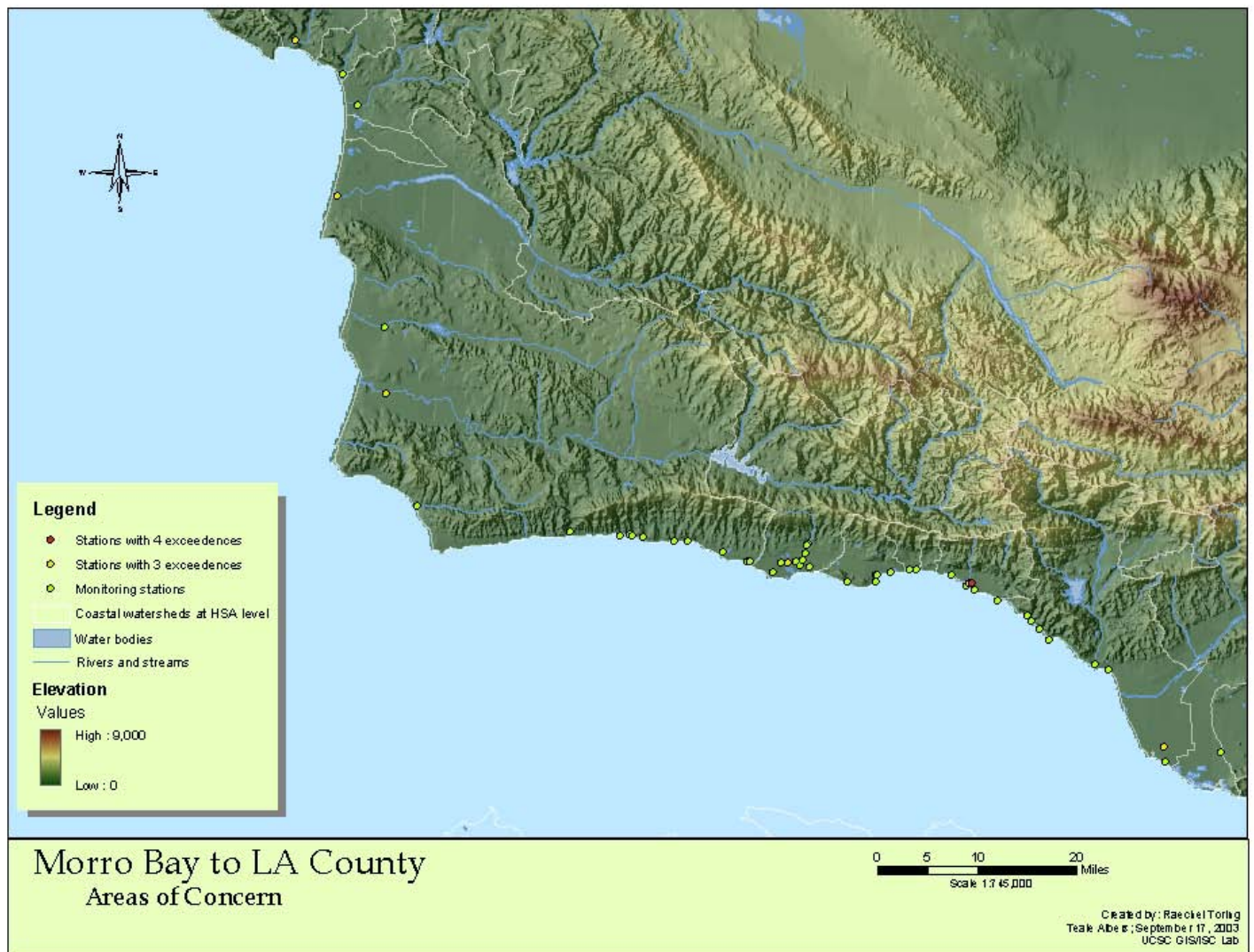


Figure 20. Monitoring stations between Morro Bay and Ventura County identified as Areas of Concern.

Los Angeles County Executive Summary-SMBK

In 1996, the Santa Monica Baykeeper identified a need to monitor and patrol the beaches in the Santa Monica Bay to find the sources of pollution and stop them. Since that time, scores of volunteers have responded to the call to help identify sources of pollution in the Bay with the ultimate goal of restoring this precious resource. And, in 1999 the Baykeeper had its first Bay wide 'snapshot' sampling event.

The Baykeeper has studied over 500 storm drains and other locations along the coast and adjacent creeks that carry storm water runoff into our bay. The drains range in size and shape, but they all have the potential to contribute to the poor health of our local waters.

For the Coast Wide Snapshot Day event in 2003 Baykeeper coordinated 80 volunteers to monitor 100 sites in Los Angeles County (see Figure 21) Water bodies as diverse as urban drainages and major river systems were monitored. A particular focus during this event was Ballona Creek. The Los Angeles Regional Water Quality Control Board has been working closely with the Baykeeper to implement an effective monitoring program that assists in pollutant source identification, and determination of water quality impairments by various pollutants. Baykeeper's current monitoring program has contributed to the development of site-specific implementation plans for the removal of these pollutants. This information will also be useful in crafting monitoring and implementation plans for upcoming Total Maximum Daily Load (pollution limits) for Ballona Creek.



Greg, a SMBK Volunteer, measures conductivity in a Los Angeles drainage.

Some of the volunteer teams measured dissolved oxygen, pH, conductivity, temperature, and turbidity. The majority of the volunteers collected water samples and conducted visual observations in the field. Seventy water samples were then analyzed for three types of indicator bacteria. Table 10 provides a summary of the result statistics for this area.

| SMBK | Los Angeles County | | | | | | |
|----------------------------|--------------------|------------------|-----------------------|-----------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Sites with Exceedences | Minimum Result | Maximum Result | Average Result |
| AirTemp (Deg C) | none | 50 | | | 15.0 | 30.0 | 19.97 |
| Conductivity (uS) | none | 29 | | | 62.9 | 8770.0 | |
| Dissolved Oxygen (ppm) | ≥ 5 | 47 | 9 | 19% | 1.2 | 16.2 | 7.6 |
| pH | ≥ 6.5, ≤ 8.5 | 50 | 6 | 12% | 7.0 | 10.1 | 8.06 |
| Turbidity (JTU) | ≤ 20 | 49 | 0 | 0% | 0.0 | 15.7 | |
| WaterTemp (Deg C) | ≤ 22 | 54 | 4 | 7% | 12.0 | 32.0 | 17.63 |
| E. Coli (MPN/100 ml) | ≤ 235 | 72 | 39 | 54% | 10.0 | 140000.0 | |
| Enterococcus (MPN/100ml) | ≤ 61 | 70 | 60 | 86% | 10.0 | 24000.0 | |
| Total coliform (MPN/100ml) | ≤ 10000 | 70 | 40 | 57% | 10.0 | 241920.0 | |
| Nitrate-N (mg/L) | ≤ 10 | 43 | 0 | 0% | 0.0 | 7.8 | 0.94 |
| Ortho-phosphate-P (mg/L) | ≤ 0.10 | 44 | 36 | 82% | 0.0 | 4.2 | 0.66 |

Table 10. SBCK Result Statistics and exceedence table.

California Coast Wide Snapshot Day 2003



Figure 21. Snapshot Day monitoring stations in the Los Angeles County area.

More than half of the sites monitored on Snapshot Day in Los Angeles County exceeded the Basin Plan water quality standards set for *E. coli* bacteria. In addition, water samples were also collected at 44 sites for laboratory analysis of nitrate, and orthophosphate. There were no exceedences for nitrate, however 82% of the sites exceeded the orthophosphate water quality objective of 0.10 ppm. The three maps on the following pages show the stations with result values for field parameters found to be in unacceptable ranges (Figure 22), the stations with result values for lab parameters found to be in unacceptable ranges (Figure 23), and stations where there were Areas of Concern identified for the Los Angeles County area (Figure 24).

California Coast Wide Snapshot Day 2003

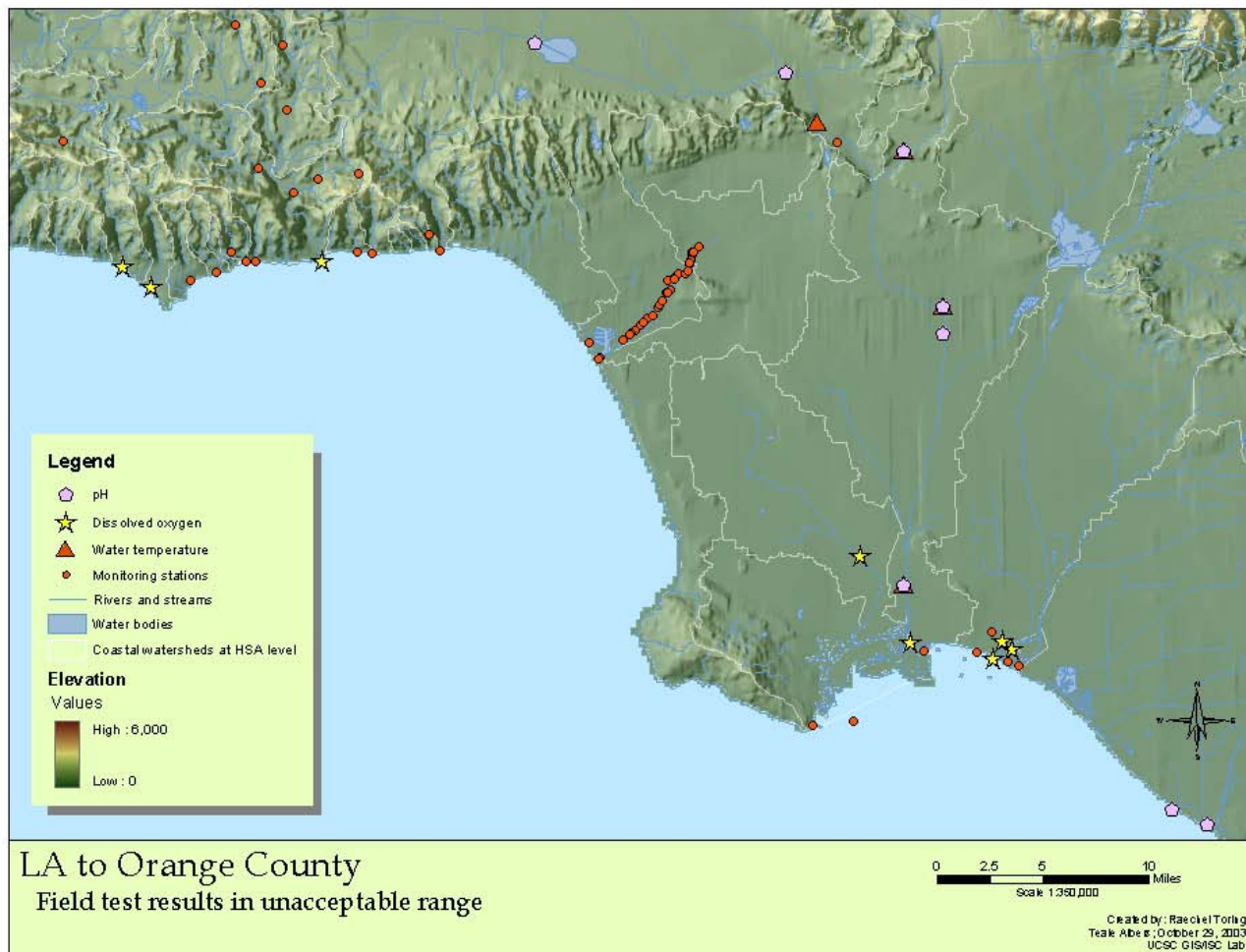


Figure 22. Monitoring station in the Los Angeles County area with field results in unacceptable ranges.

California Coast Wide Snapshot Day 2003

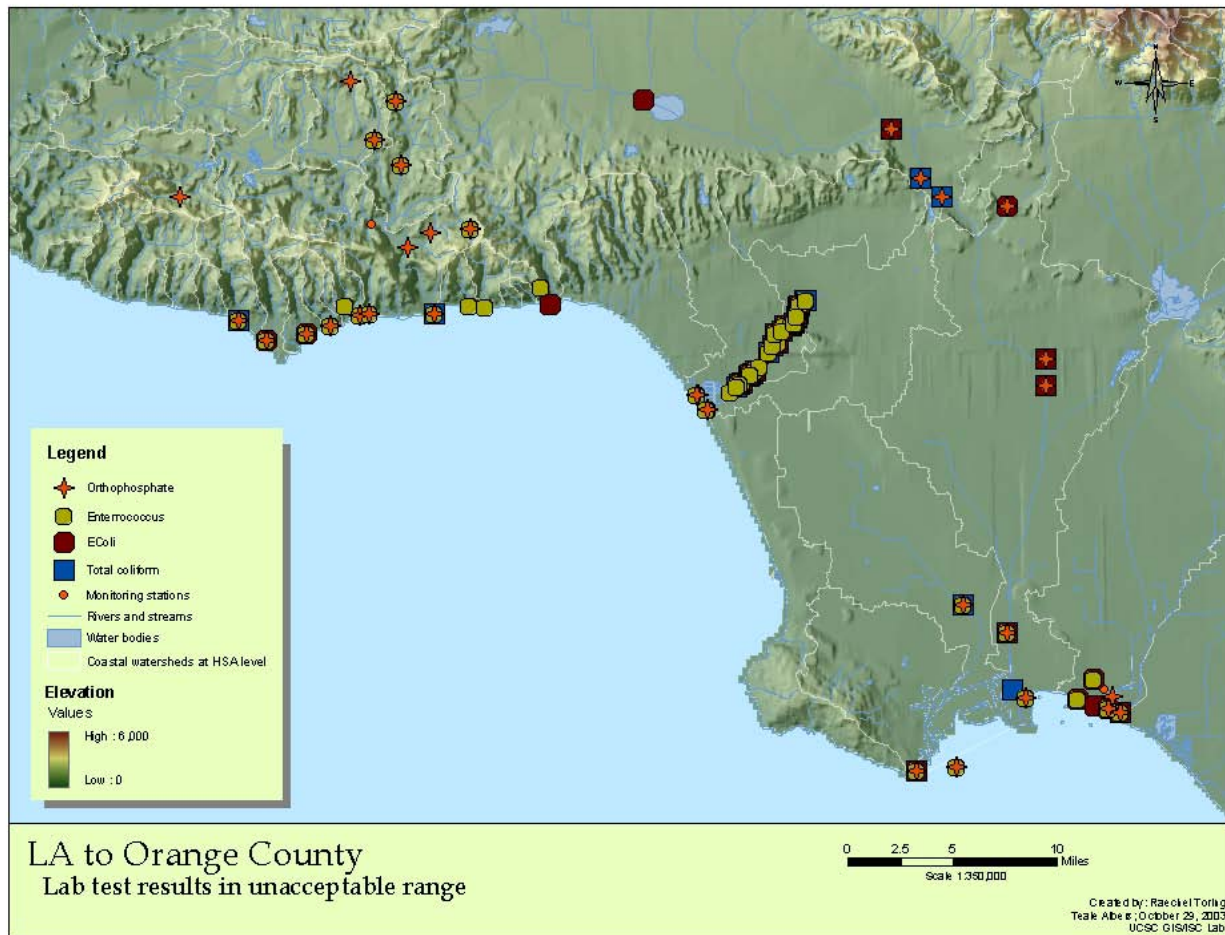


Figure 23. Monitoring station in the Los Angeles County area with lab results in unacceptable ranges.

California Coast Wide Snapshot Day 2003

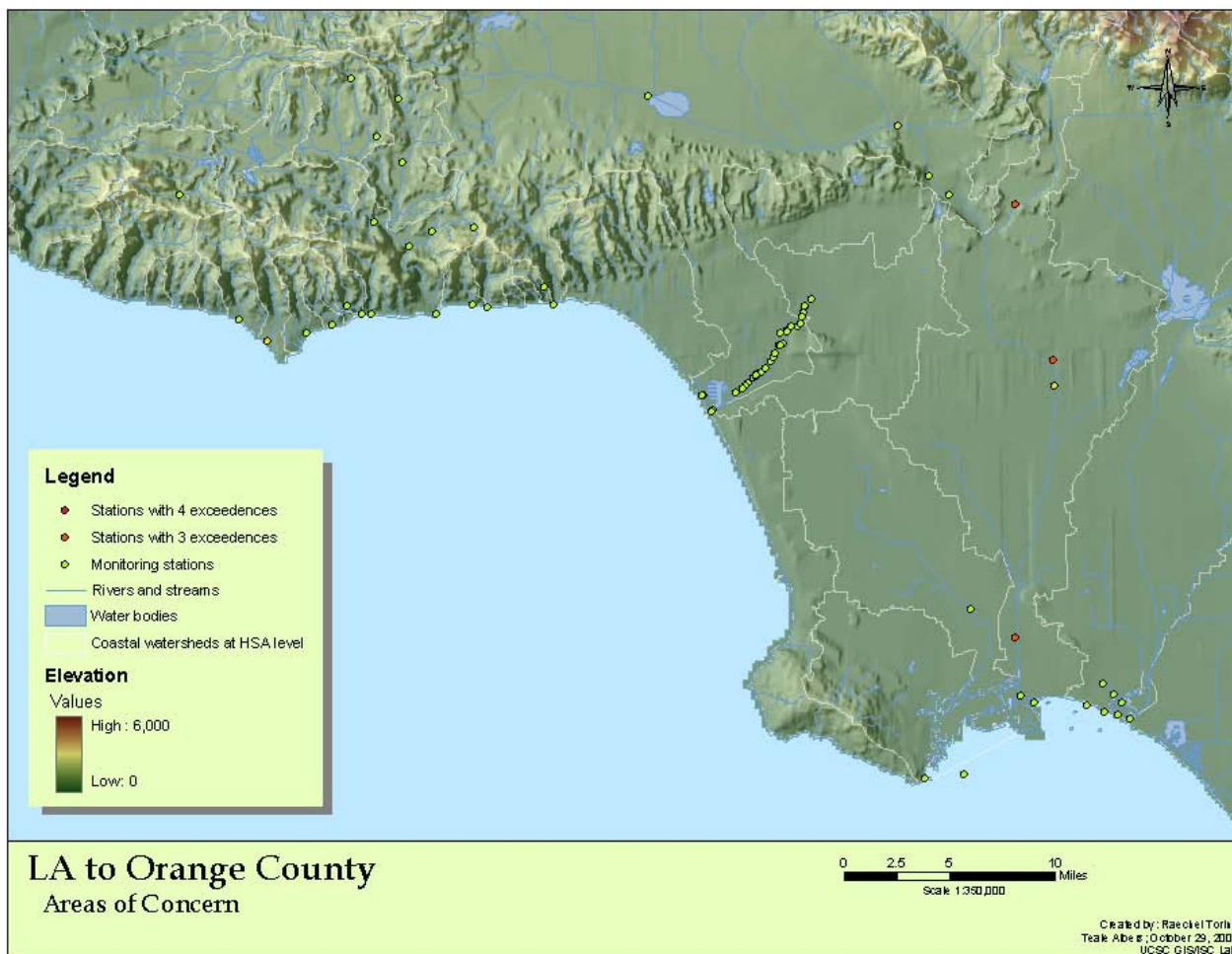


Figure 24. Snapshot Day monitoring stations in the Los Angeles County area identified as Areas of Concern.

Orange County Executive Summary-OCCK

May 17, 2003 was a landmark day for water monitoring in Orange County. As part of California Coastwide Snapshot Day, an extension of a program that began on the Central Coast four years ago on Earth Day 1999, volunteers collected water quality data in watersheds from Seal Beach south to San Clemente. Five organizations joined together under the direction of Orange County Coastkeeper and combined their resources to monitor all of the streams flowing to the ocean in Orange County.

This was a special year for Snapshot Day because the successful Central Coast event spread to the entire coast of California. The event was all the more important as this was the first time that all of the non government organizations currently monitoring water quality in Orange County worked together on a large scale project. Along with the valuable data collected there is a new spirit of cooperation amongst the participating groups.

Within Orange County, 24 people monitored 37 sites on 17 creeks and rivers (see Figure 25). Water bodies as diverse as urban drainages, creeks, and major river systems were monitored. Teams measured dissolved oxygen, pH, conductivity, temperature, and transparency or turbidity. These are all parameters that measure the health of a water body and its ability to support fish and other aquatic organisms.

Water samples were also collected for laboratory analysis of nitrate, orthophosphate and bacteria at the majority of sites. While these constituents naturally occur, excessive concentrations, usually introduced by humans, can be harmful to both human health and aquatic organisms. High levels of bacteria can cause illness in humans and usually are the result of unknown or urban sources. High nutrient levels cause vegetation to choke a stream with too much plant growth and can deplete the amount of oxygen in the water that organisms require to breath. Table 11 provides a summary of the result statistics for this area.

Table 11. OCCK Result Statistics and exceedence table.

| ORANGE COUNTY | Orange County | | | | | | |
|----------------------------|----------------------|------------------|-----------------------|-----------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Sites with Exceedences | Minimum Result | Maximum Result | Average Result |
| AirTemp (Deg C) | none | 29 | | | 15.50 | 27.20 | 22.53 |
| Conductivity (uS) | none | 30 | | | 1240.00 | 61000.00 | |
| Dissolved Oxygen (ppm) | ≥ 7 | 34 | 11 | 32% | 4.80 | 17.60 | 8.58 |
| pH | $\geq 6.5, \leq 8.5$ | 36 | 3 | 8% | 7.18 | 8.80 | 8.03 |
| Transparency (cm) | ≥ 25 | 8 | 1 | 13% | 10.60 | 122.00 | 93.50 |
| Turbidity (JTU) | ≤ 20 | 27 | 0 | 0% | 0.00 | 9.00 | |
| WaterTemp (Deg C) | ≤ 22 | 36 | 7 | 19% | 7.12 | 26.30 | 19.52 |
| E. Coli (MPN/100 ml) | ≤ 235 | 35 | 10 | 29% | 10.00 | 20980.00 | |
| Total coliform (MPN/100ml) | ≤ 10000 | 36 | 17 | 47% | 10.00 | 241920.00 | |
| Nitrate-N (mg/L) | ≤ 2.25 | 30 | 4 | 13% | 0.00 | 5.00 | 0.98 |
| Ortho-phosphate-P (mg/L) | ≤ 0.10 | 30 | 18 | 60% | 0.00 | 1.75 | 0.33 |

California Coast Wide Snapshot Day 2003

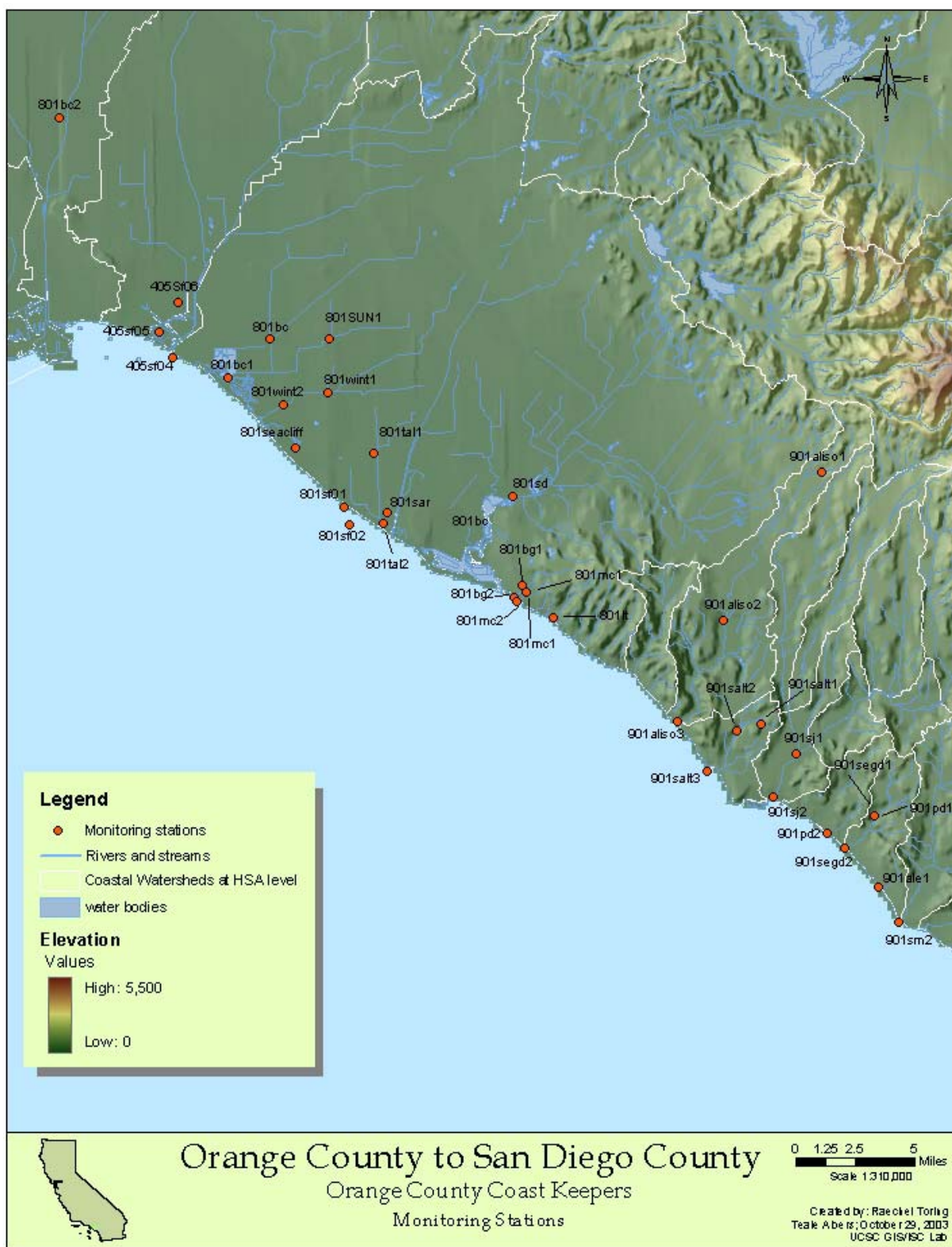


Figure 25. Snapshot Day monitoring stations in the Orange County area.

California Coast Wide Snapshot Day 2003

As expected, excessive nutrients and bacteria proved to be the biggest problems in Orange County's waterways. Eighteen of the 30 sites sampled showed high levels of orthophosphate, an essential plant nutrient that becomes a problem in excessive amounts. Since Orthophosphate is the limiting nutrient in most plant ecosystems the high levels found are a major contributor to the thick alga growth seen in many Orange County streams. Bacteria were also a significant problem with seventeen of 36 sites exceeding the Total Coliform standard and ten exceeding the standard for E.Coli. This is particularly important as many of these areas are in parks or residential areas where people are likely to come in contact with the water. There are many natural sources of bacteria but the levels found are high enough to be of concern (See Figure 27 for stations with lab results out of acceptable ranges).

Other issues in Orange County's waterways include the classic problems associated with urban waterways. High water temperatures in concrete lined channels such as the Wintersberg and Bolsa Channels along with surprisingly high temperatures for fast flowing urban streams such as Buck Gully in Newport beach and Salt Creek in Dana Point. The San Gabriel River showed a marked link between high water temperature and low dissolved oxygen, a deadly combination for aquatic life. In other areas this effect was probably masked by the presence of a large amount of alga, which produces oxygen during daylight hours raising the measured levels (See Figure 26 for stations with lab results out of acceptable ranges).

Not all the news for our Orange County waterways is bad however. The water clarity was good in most sites along with nitrate levels, pH and conductivity. Most of this data corresponds with the perceptions Orange County residents and water quality professionals already have of our waterways. Now that there is definitive data to support those speculations, progress toward improving water quality can proceed.

California Coast Wide Snapshot Day 2003



Figure 26. Monitoring station in the Orange County area with field results in unacceptable ranges.

California Coast Wide Snapshot Day 2003



Figure 27. Monitoring station in the Orange County area with lab results in unacceptable ranges.

California Coast Wide Snapshot Day 2003

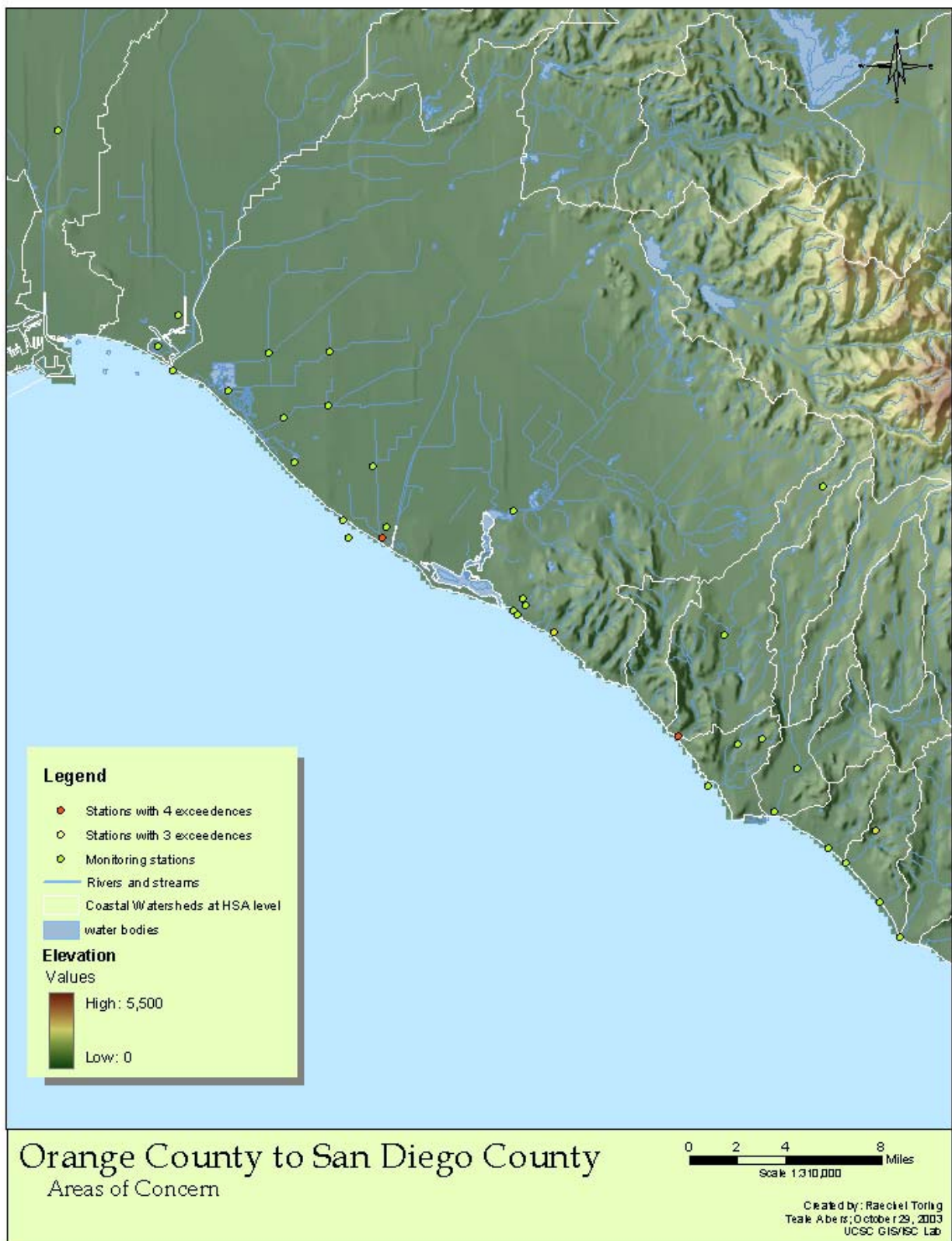


Figure 28. Snapshot Day monitoring stations in the Orange County area identified as Areas of Concern in 2003.

San Diego County-Ensenada, Mexico Executive Summary-SDBK

The San Diego Baykeeper's Binational Water Quality Monitoring Program (BWQMP) coordinated the 2003 Coast Wide Snapshot Day in San Diego. It was a binational event that extended from San Diego's North County coast to Ensenada, Mexico. Over 120 miles of coastline were covered and eight major coastal watersheds in the region were sampled. The combined population and drainage area of these watersheds exceeds 3 million residents and 3000 square miles, respectively.

On May 17th, 2003, under the direction of the BWQMP, 138 citizens helped monitor 30 sites at eight major watersheds in the San Diego-Baja California region (See Figure 29). Volunteers gathered at one of three hubs strategically placed in Playas de Tijuana, downtown San Diego and North County San Diego. The hub system facilitated logistics greatly by providing centrally located operation centers and also gave volunteers a sense of being part of a larger event.

The 2003 Coastal Snapshot Day represented a historical event for the San Diego-Baja California region, as it was the first time that a coordinated binational citizen water monitoring effort of such magnitude was launched. Water bodies as diverse as urban drainages, rural creeks and major river systems were monitored. Teams of volunteers trained by BWQMP staff measured dissolved oxygen, pH, conductivity, temperature, and turbidity. Additional water samples were also collected for further nitrate and indicator bacteria laboratory analyses at selected sites.

While the constituents measured are naturally occurring, excessive concentrations of some of these can be harmful to both human health and aquatic organisms. As an example, high levels of bacteria can cause illness in humans and can be the result of sewage spills, failing septic systems or illicit connections to the storm drain system. These parameters combined gave an indication of the condition of the region's waterbodies and their ability to support wildlife and assigned beneficial uses (e.g., recreational swimming, municipal water supply, etc). Table 12 provides a summary of the result statistics for this area.

Table 12. SDBK Result Statistics and exceedence table.

| SDBK San Diego County to Baja Mexico | | | | | | | |
|--------------------------------------|--------------|------------------|-----------------------|-----------------------------------|----------------|----------------|----------------|
| Parameter | WQO | Stations Sampled | Number of Exceedences | Percent of Sites with Exceedences | Minimum Result | Maximum Result | Average Result |
| Air Temp (Deg C) | none | 33 | | | 16.25 | 26.50 | 2.55 |
| Conductivity (uS) | none | 30 | | | 960.00 | 58650.00 | |
| Dissolved Oxygen (mg/L) | ≥5 | 30 | 8 | 27% | 2.00 | 12.00 | 6.79 |
| pH | ≥ 6.5, ≤ 8.5 | 30 | 1 | 3% | 7.00 | 9.00 | 7.93 |
| Turbidity (NTU) | ≤ 20 | 30 | 13 | 43% | 0.45 | 79.30 | |
| Water Temp (Deg C) | ≤ 27 | 30 | 0 | 0% | 15.00 | 23.00 | 19.27 |
| E. Coli (MPN/100 ml) | ≤ 235 | 12 | 4 | 33% | 10.00 | 6131.00 | |
| Total coliform (MPN/100ml) | ≤ 10000 | 12 | 6 | 50% | 41.00 | 24193.00 | |
| Nitrate-N (mg/L) | ≤ 2.25 | 12 | 0 | 0% | 0.02 | 1.18 | 0.32 |



Figure 29. Snapshot Day monitoring stations in the San Diego-Baja area.

California Coast Wide Snapshot Day 2003

The majority of the sites monitored on Snapshot Day, with some exceptions, met Federal, State and regional water quality standards. The average dissolved oxygen level for the San Diego-Baja California coastal sites was 6.79 mg/l O₂. Values ranged from 2.0 to 12.0 mg/l O₂. Results showed that over one quarter (26.7 %) of the sites had dissolved oxygen concentrations below the water quality objective of 5 mg/L. One site, in the Chollas Creek watershed, had a dissolved oxygen concentration approaching anoxic conditions (2.0 mg/l O₂).

The average regional *E. coli* concentration was 731 MPN *E. coli* /100-ml. Values ranged from 10 to 6131 MPN/100-ml. Out of 12 sites tested for *E. coli* four showed exceedances (33.3%). The highest concentration (6131 MPN *E. coli*/100-ml) was observed in the Arroyo Guagatay in Rosarito, Baja California. The three maps on the following pages show the stations with result values for field parameters found to be in unacceptable ranges (Figure 30), the stations with result values for lab parameters found to be in unacceptable ranges (Figure 31), and stations where there were Areas of Concern identified for the Los Angeles County area (Figure 32).

California Coast Wide Snapshot Day 2003

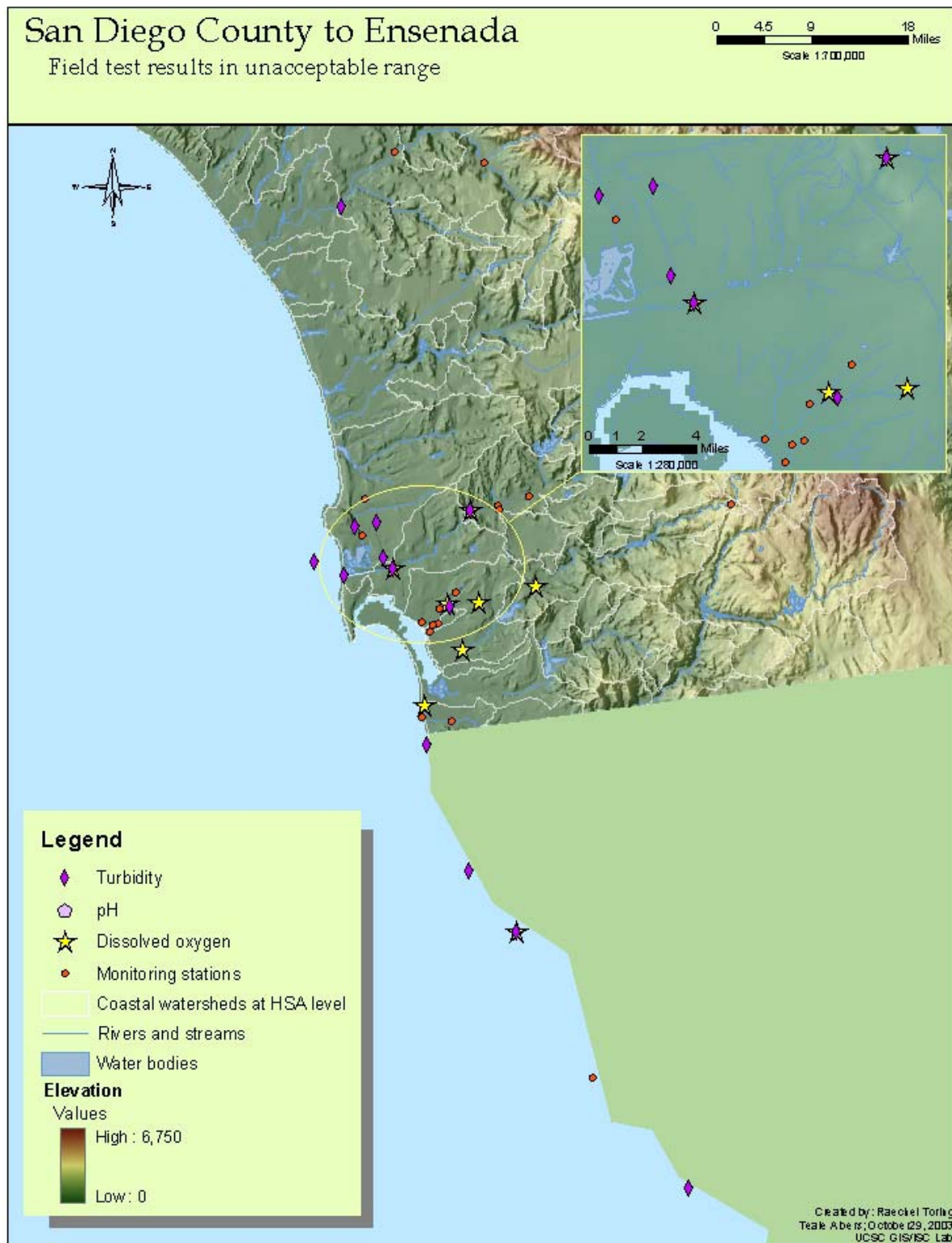


Figure 30. Monitoring station in the San Diego-Baja area with field results in unacceptable ranges.

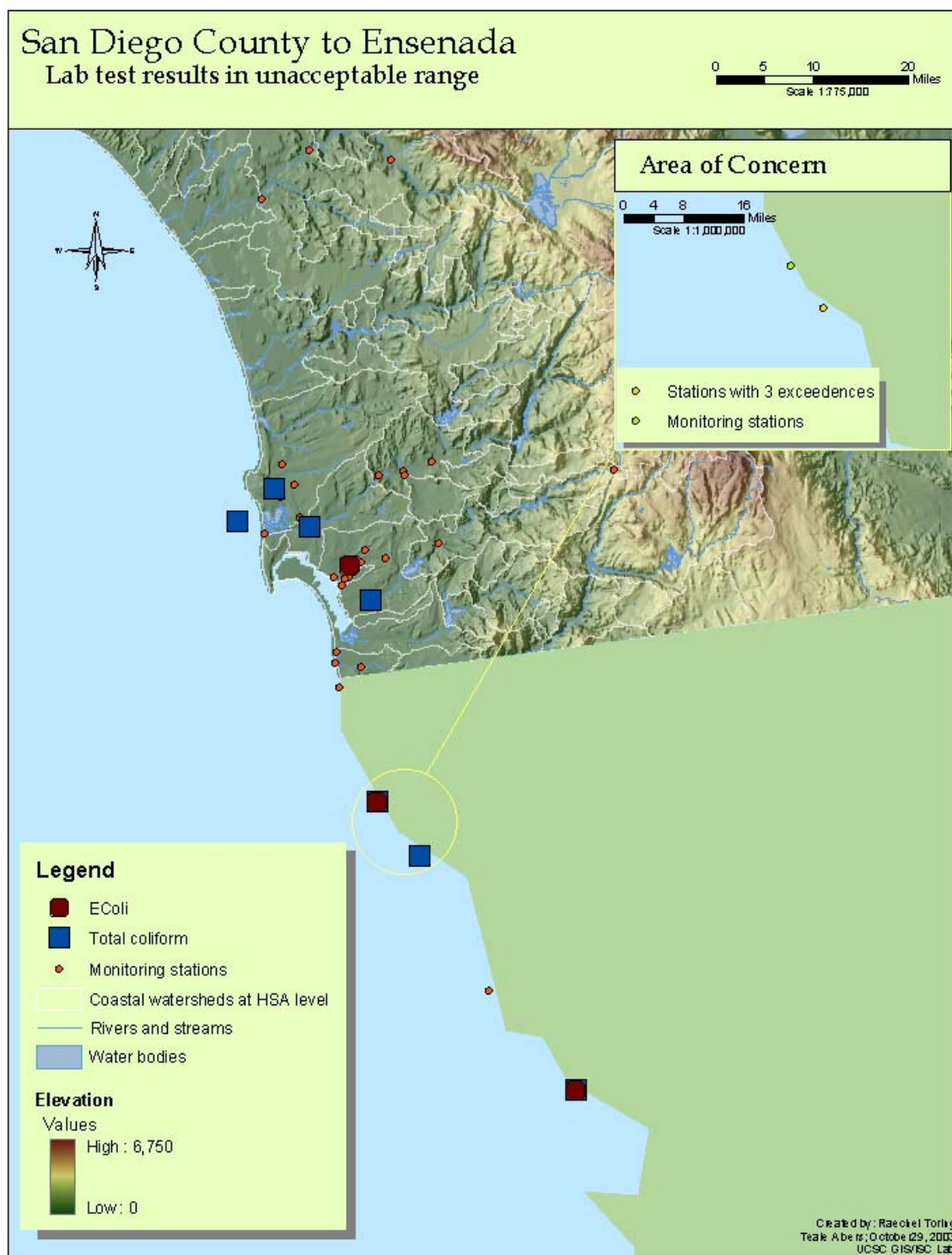


Figure 31. Monitoring station in the San Diego-Baja area with lab results in unacceptable ranges. The insert box shows the location of the single station designated an Area of Concern for this area.